

fact, we may, perhaps, in conclusion, be permitted to indulge in a short flight of fancy. Let us endeavour to realise how great is the distance in time which separates the savage of Craven from our own day. We have the history of much of it in the Victoria Cave itself, and we may restore some of the missing pages from the surrounding district.

At the cave, Roman times are separated from our own by sometimes less than one, but not more than two, feet of talus, the chips which time defaches from the cliffs above. The Neolithic age, which antiquaries know was a considerable time before the Roman occupation, is represented by a layer in some places four or five feet beneath the Roman, in others even running into it. Then comes a thickness of 19 feet of talus without a record of any living thing. Judging by the shallowness of the Roman layer, this must represent an enormous interval of time. And this takes us down to the boulders, the inscribed records of the Glacial Period. They must represent a long series of climatal changes, during which the ice was waxing and waning, advancing and melting back over the mouth of the Victoria Cave. This period saw the Reindeer and the Grisly Bear occasionally in possession. Then we have an unconformity, a break in the continuity of the deposits, the boulders lying on the edges of the older beds. Time again! and that time long enough for changes to take place which allowed the district to cool down from a warmth suitable to the Hippopotamus, and become a fitting pasture-ground for the Reindeer. It was in that warm period that the early Craven savage lived and died.

But these are not all the changes which occurred in the North of England since that time. The age of the great submergence represented by the sea beaches of Moel Trylaen and Macclesfield, and by the Middle-Sands-and-Gravels of Lancashire, has left no record up at the cave. Your reporter is of opinion that the submergence did not attain in that district a greater depth than six or seven hundred feet, and this would still leave the cave 750 feet above the sea, though it would cut up the land into a group of islands. The fact is sufficient for us, the depth is immaterial.

Upon no fact are geologists better agreed than upon the existence of a wide-spread submergence and emergence of land towards the close of the Glacial Period. No tradition is common to more races and religions than that of a great deluge. Where back in the past is the common point whence these two far-travelled, almost parallel rays of truth had their origin? In the opinion of your reporter the Craven savage who lived before the Great Ice-sheet, and before the Great Submergence, may form another of the many strong ties which bind together the sciences of Geology and Anthropology.

GERMAN SCIENTIFIC AND MEDICAL ASSOCIATION*

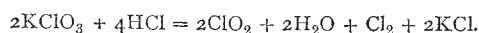
THE following communications were made to the various sections. Of many of these papers our space permits us to give little more than the titles and names of authors:—

Section 1. *Astronomy and Mathematics*.—The laws of comets, by M. von Hauenfels.—On the idea of space, by Prof. Hoppe.—On properties of tetragons between hyperbolas, by Prof. Reitlinger.—On the criteria of maxima and minima in definite integrals, by Prof. Zmurko.—On Voigtländer's newest telescopes, by A. Martin.—On the mathematical series called chains, by Dr. Günther.

Section 2. *Physics and Meteorology*.—The new polariscope of Mach, by Dr. Subic.—The glimmer combination of Reusch and their significance for theoretical optics, by Dr. Sohnke.—The relation between the temperature and the inner friction of gases, by Capt. Obermeyer.—Dr. Prestel showed his climatographical atlas of Germany.—On changes of induction-currents through iron nuclei, by A. Ettingshausen.—On the isogonic lines in Transylvania, by G. Schenzl.—On microscopical photography, by A. Martin.—On the increase of the velocity of evaporation through electricity, by Dr. Reitlinger.—On the temperature of steam given off by solutions of salts, by L. Pfaundler.—Method of representing the various constituents of weather in a short and exact manner, by Dr. Prestel.—The conducting powers of several acids for electricity, by Prof. Kohlrausch.—On mirror observations with minute mirrors, by Prof. Boltzmann.

Section 3. *Chemistry*.—On a new colouring matter, phloëin, by R. Benedict (already published in the *Annalen der Chemie*).—R. Böttger proved that Gore's inflammable antimony

contains not only chloride of antimony, but also occluded hydrogen, transforming, as it does, ferricyanide into ferrocyanide of potassium. The same chemist has found glycerine to preserve palladium-hydrogen for three months or longer. The same chemist also showed a new solvent for tri-nitro-cellulose, viz., sodic sulphhydrate.—Dr. Schwartz showed the oxidation of ammonia to nitric acid by means of hypermanganate of potassium.—Dr. Meusel proved the transformation of ammonia in water into nitrites to be due to the presence of bacteria, and to be prevented by benzoic, carbolic, or salicylic acids, that kill the bacteria.—A. Mitscherlich showed a new air-thermometer.—A. Butlerow presented observations on the transformation of hydrocarbons C_nH_{2n} into alcohols.—The same chemist has found a phenol $C_{15}H_{24}O$ in the juice of *Cynanchum acutum*.—L. v. Pebal showed new apparatus for disengaging gases, and new thermometers for lecture purposes.—A. Michaelis reported on the continuation of his experiments on aromatic compounds of phosphorus.—H. v. Richter on the action of cyanide of potassium on nitro-compounds, and on the transformation of aromatic amides into bromides.—M. Conrad on dichloro-aceto-acetic ether.—H. Schacherl demonstrated that hydrochloric acid and chlorate of potassium yield hypochlorous acid:—



—E. Urban communicated that phosphoric anhydride transforms allylic alcohol, not into allylene, but marsh-gas.—Prof. Butlerow insisted upon the necessity of introducing dynamical views into the constitution-theory of chemical molecules, and explained his intentions by drawing attention to the various decompositions which both cyanic and hydrocyanic acids offer under different circumstances.—I. Iobst sent a communication on a Bolivian bark *Quina cota*, which is free from quinine, but contains 1½ per cent. of a new crystalline body not yet analysed.

Section 4. *Mineralogy and Geology*.—On a Labyrinthodont found near Brünn, by A. Markowsky.—Geology of the Vienna Waterworks, by F. Karrer.—On minerals enclosed in the volcanic conglomerates of the Swabian Alps, by Prof. Nies.—On the Brown-coal Flora of Styria, by C. von Ettingshausen.—On Baer's law respecting the flowing of rivers of a southern direction, by A. Dunker.—On the influence of plants for diminishing the surface of lakes, by Dr. Senft.—On a fossil resin, Hartit, by Dr. Hofman.—On the magnetites of Styria, by Prof. Rumpf.—On the results of deep borings in the North German Plain, by Dr. Huysser.—On the granites of the mountain-range, Böhmerwald, by Dr. Woldrich.—On earthquakes (trying to demonstrate the action of the moon on subterranean volcanic eruptions), by R. Falb.—On the falling in of abandoned coal-mines in Königshütte (Silesia), by Dr. Serle.—On eruptive formations in the Fassa-valley and Fleimser-valley, by C. Dölter.—On a discovery lately made near Stuttgart, of eighteen Saurians, partly measuring as much as 0.9 metres in length, by Dr. Karpff.—On corals in Tertiary sediments of Krain, by W. Linhart.

Section 5. *Botany*.—C. von Ettingshausen communicated phyto-paleontological studies in their bearing on the transformation of species; also a paper on the transformation of *Castanea atavica* into *Castanea vesca*.—Dr. Eidam described the development of the sexual organs of Hymenomycetes.—On high pressure in the cells of plants, by Dr. Pfeffer.—On morphology of cryptogamea, by Dr. Prantl.—On the flora of Australia and of the Cape, by C. v. Ettingshausen.—On the sexual life of plants, by E. Strasburger.—On the vegetation of Mount Etna, by G. Strobl.—On Theophrastus as a botanist, by O. Kirchner.—On a monstrous organ in *Marchantia polymorpha*, by Prof. Leitgeb.—On acclimatising *Rheum Ribes* in Vienna, by Prof. Fenzl.—Morphology of mosses (Lebermoose) and application of phenol and essential oil of cloves for botanical preparations, by H. Leitgeb.

Section 6. *Zoology and Comparative Anatomy*.—On the zoological station at Trieste, and on a sponge, *Sycandra raphanus Eeckel*, by F. E. Schulze.—On the genus *Myzostomum*, by L. Graff.—On the penis of Scolytides and the chewing apparatus of the same genus, by Prof. Lindemann.—On *Psychoptera contaminata*, by C. Grobben.—On the circulation of molluscs, by Prof. Kollmann.—On the curves described by the legs of insects, by V. Graber.—On noctilucous Dipteræ at the Aral lake-district, by W. Aleutzin.—On the ear of Heteropodes, by Prof. Claus.—On *Podocoryne carnea*, by C. Grobben.—The typical forms of the skulls of cattle, by Dr. Wilckens.—On the differentiation in certain species of beetles (*Carabus monilis*, *arrogans*, and

* Continued from p. 34.

Ullrichii) produced by climate, by Dr. Kraatz.—On the anatomy of Turbellariae, by L. Graff.

Section 7. *Anatomy and Physiology*.—On the texture of the cerebellum of man, by B. Stilling.—On the time necessary for developing muscular currents, by H. Hermann.—On the nervus vagus, by Dr. Steiner.—Application of anilin-red for microscopical objects, by E. Hermann.—Contribution to the physiology of muscles, by Prof. Auerbach.—On Newton's law of temperatures with regard to animal heat, by A. Adamkiewicz.—Prof. Gscheidlen proved that the activity of nerves is connected with oxidising processes.—On the retina of snakes, by Dr. Flesch.

The Sections 8 (*Pathology*), 9 (*Medicine*), 10 (*Surgery*), 11 (*Ophthalmology and Otiatics*), 12 (*Midwifery*), 13 (*Psychiatrics*), 14 (*Hygiene*), 15 (*Military Surgery*), and 20 (*Diseases of Children*), being devoted to medicine, must be omitted in this report; excepting, however, a paper read in Section 9, by Dr. Knapp, on the Styrian habit of arsenic-eating. The speaker introduced two men, fifty-five and twenty-five years old, who had been in the habit of eating arsenic for years, the former having contracted this habit in 1849, to save himself (in his opinion) from an epidemic of typhus then raging. The other, a farm-servant, applied arsenic to improve the health of cattle, and accustomed himself to its use. They have gradually increased the dose to about 0.5 gram. As_2O_3 or As_2S_3 , taken once a week. They swallowed before the eyes of the Section 0.3 gr. of orpiment and 0.5 gr. of arsenious acid respectively. Only strong people seem to adopt this habit, and they do not appear to suffer in health through it. With women it has been known to produce abortus (see also Section 17).

Section 16 "*Naturwissenschaftliche Paedagogic*" (*on the Teaching of Science in Schools*) was composed of teachers, who discussed the means for teaching and the extent to which science should be taught in schools.

Section 17. *Agricultural Chemistry*.—On estimating atmospheric carbonic acid, by Dr. Fittbogen.—On experiments made in the agricultural station of Proskau on the influence of shearing in increasing the weight of sheep (it being found that shearing increases their appetite), and on the influence of arsenic in fattening animals, by O. Kellner. It appears that arsenic increases the power of digesting fat, and decreases the amount of nitrogen given off in urine, thus assisting materially in the formation of flesh.—On potato-feeding, by Dr. Wolf.—On the specific weight of seeds and on the bearing of analytical results on the physiological value of seeds, by G. Marck.—On fibrous plants and their cultivation in moors for the purpose of paper-making, by H. Stierner.—On the value of animal protein, by Dr. Wild.—On the proportion of solid and liquid matter in plants in different periods of their vegetation, and on the decrease of salts in water used for watering fields in Westphalia, by Dr. König.—On the solubility of phosphates of lime, and on the treatment of bones with superheated steam, by Dr. Krockner.

Section 18. *Geography and Ethnology*.—Prof. Friesach explained a table destined for mariners to facilitate the finding of the shortest route between two points of the globe.—Dr. V. Zwiedinesk reported on a journey to the Wan Lake (Curdistan).—Von. Hochstaetter showed Mr. Mundy's photographs of New Zealand.—On the course of the Arctic vessel *Tegethof*, by Vice-Admiral Baron Willerstorff.—On Arctic ice, by Lieut. Weyprecht.—On the project of connecting the Algerian-Tunisian plain (Chotto or Sebkhass) with the Mediterranean, by G. Stache. The author is of opinion that the advantages of this (Capt. Rondaire's) project are not in proportion to its difficulties and costs.—On Dante's views on the advancing and receding of the sea, by W. Schmidt.

Section 19. *Anthropology*.—On prehistorical remains (urns) at Maria-Rast, near Marburg (Styria), by Prof. Müllner. This burial-ground was visited by the Section, as also the field near Leibnitz, where various bronzes have been found, and the tumuli near Purgstall; Count Wurmbbrand acting as guide.—The latter reported on burial-grounds in Upper Hungary.—On a burial-ground near Innsbruck, by Dr. Wieser.—On Slavian legends, by Prof. Müllner.—On Celtic remains in Styria, by F. Ferk.—On the cavern of Byci-Scala in Moravia, by H. Wankel.—On diluvial man, by Count Wurmbbrand.—On lake-cities (Pfahlbauten) in the moors of Laibach, by Dr. Deschmann.—On prehistorical walls and ditches in Hungary, by Dr. Romer.—On the natural law of the formation of states, by L. Gumplowicz.—On prehistorical measures, by R. v. Luschin.—On Celtic warfare, by Dr. Weiss.

A. OPPENHEIM

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, Nov. 11.—Prof. Cayley, F.R.S., in the chair.—Prof. Sylvester, F.R.S., gave an account of results arrived at in his communication "on the fifteen young ladies problem and a general mathematical theory of pure syntax." The problem, which was first considered by Mr. Sylvester more than twenty-five years ago, was not at that time published by him: it was then discussed by Prof. Cayley, next proposed by Rev. T. P. Kirkman in the "Lady's and Gentleman's Diary" for 1850: solutions were given in the "Diary" for 1851; but it was not until the year 1862 that an elaborate solution was given by Mr. W. S. B. Woolhouse in the volume for that year. The problem may be enunciated as follows:—"In a school of fifteen girls, a rule has been laid down that they shall walk out every day in rows of threes, but that the same two girls shall never come together twice in the same row. The rule is supposed to have been carried out correctly during the six working days of the week, but when the time comes for their going to church together on Sunday it is found to be absolutely impossible to continue it any further. Can the rule have been carried out correctly during the six previous days?"—Other papers brought before the Society were: "On the relation between Bernoulli's numbers and the binomial coefficients," by Mr. J. Hammond. The paper, which was accompanied by a coloured diagram, showing how certain four determinants for the numbers are formed of selected coefficients, contained some interesting numerical results which follow directly from certain division formulæ given in a former paper by the same writer.—"On three-bar motion in plane space," by Mr. S. Roberts. In this communication the author determines three foci, any two of which may be taken as centres of the link movement and the nature of the linkwork in each case.—"Values of certain infinite products, with an application to the summation of the geometrical series of the n th order as a definite integral," by Mr. J. W. L. Glaisher, F.R.S.—"On the form of cam which, acting on a lever, shall communicate a motion such that the angular velocity ratio of the lever and cam is a given function of the angle described by the latter," by Major J. R. Campbell.

Geological Society, Nov. 3.—Mr. John Evans, V.P.R.S., president, in the chair.—Mr. Thomas Andrew, 18, Southernhay, Exeter; Mr. Harry M. Becher, White Lodge, Barnes, S.W.; Mr. Arthur Back Kitchener, F.C.S., 19, Buckingham Street, Strand, W.C.; Mr. Daniel Morris, Grammar School, Burnley; Mr. Christopher Thomas Richardson, M.D., 13, Nelson Crescent, Ramsgate; and Mr. Gustavus A. H. Thureau, Lecturer on Geology and Practical Mining, School of Mines, Sandhurst, Victoria, were elected Fellows of the Society.—On some new Macrurous Crustacea from the Kimmeridge Clay of the Sub-Wealden Boring, Sussex, and from Boulogne-sur-Mer, by Mr. Henry Woodward, F.R.S. The first species described by the author belonged to the fossorial family Thalassinidae, six species of which belonging to four genera are now found on the British coasts. The known fossil species are from the Chalk of Maestrich, the Greensand of Bohemia and Silesia, the Chalk of Bohemia, the Greensand of Colin Glen, near Belfast, and the Upper Marine Series of Hempstead, Isle of Wight. All these are referred to the genus *Callianassa*, which also includes the species from the Kimmeridge Clay described in this paper. The fossil is seen in profile on several sections of the core, and has the enlarged hands of the fore limbs more nearly equal in size than in the living species of *Callianassa*; the carapace and segments of the abdomen are smooth, and the latter are somewhat quadrate in profile, contracted at each extremity, and not pointed, and the caudal plates are oval. For this Crustacean the author proposes the name of *Callianassa isochela*. The second species described belongs to the genus *Mecochirus*, distinguished by the great length of the fore-limbs, which is equal to that of the whole body, the oldest known species of which (*M. olifex*, Quenst.) is from the Lower Lias of Württemberg. It was obtained, together with *Lingula ovalis*, from the Kimmeridge Clay of Boulogne, by Mr. J. E. H. Peyton, after whom the author proposes to name it *M. Peytoni*. In this species the fore-legs are very finely punctate, and measure seventy-five millims. in length. The rostrum is somewhat produced, and the carapace, which is finely granulated, measures thirty millims. in length. The antennæ are long and slender. The abdomen measures forty-five millims., and the epimeral borders of the segments are falcate. The species is intermediate in size between *M. socialis*,